Configurable DNP Points and Implementation

Table of Contents

Introduction

This instruction sheet provides Distributed Network Protocol (DNP) points and DNP implementation information for an IntelliNode Interface Module applied in an IntelliTeam® SG Automatic Restoration System and used with software: **ITNInstaller-7.6.x.**

The software revision number is listed on the *Setup>General>Site Related* screen. The points listed here are only for the IntelliNode Interface Module and do not cover any of the external device points. DNP points sent and received by the external device will also be mapped to specific SCADA points used by the master station. Refer to the external device documentation for definitions of DNP points sent and received by that device.

The DNP master station should define the IntelliNode Interface Module with the following Status, Analog Output, Control, and Counter points:

Point	Count
Status	78
Analog Output	4
Control	14
Counter	13

DNP points for the IntelliNode Interface Module are configured to match the master station points list by using the Status, Analog Output, Control, and Counter points defined in Tables 1 through 4 on pages 3 through 13. Configuration settings for DNP point mapping are found on the *IntelliNode Setup>Point Mapping* screens and allow users to assign the appropriate SCADA point numbers. Refer to the "Communication Setup" section of S&C Instruction Sheet 1043-531, "IntelliNode Interface Module: *Setup*."

The Status points are listed on the IntelliNode *Logs>Status Point Log* screen, and Counter points are listed on the IntelliNode *Logs>Special Events* screen. These screens are shown in the "Data Logging" section of S&C Instruction Sheet 1043-551, "S&C IntelliNode Interface Module: *Troubleshooting*."

Unless otherwise noted, each point is on if the condition is logically true or active.

NOTICE

The source address in IntelliLink® Setup Software is now 65432 instead of 1.

Table 1. Status Points

Code #	Name—Definition
1	**Team Member Not Transfer Ready—**On when a control operation is not consistent with the expected team operation. A variety of manual operations will take the interface module out of the **Ready** state. Off when local manual operation and all local trouble indications have been cleared.
2	**Not All Teams Transfer Ready—**On when any team in which this control is a member is not fully operational. This may be because of an individual team member condition; team-wide conditions such as isolating a fault, team configuration or coordination problems; or the **IntelliTeam SG Restoration** setting is disabled on the *IntelliTeam SG>Team Summary* screen. Off when all conditions that caused this status point to be set have been cleared.
3	**IT Transfer in Progress—**On when the team is reconfiguring the circuit and transferring load to an alternate source. Otherwise, off.
4	**IT Return to Normal in Progress—**On when the team is returning the circuit to its normal configuration. Otherwise, off.
5	**IT Prohibit Restoration Enabled—**On when the **Prohibit Restoration** command is received from a SCADA **Latch-On** command, IntelliLink software, or a front panel command. Otherwise, off.
6	**Prohibit Restoration Timer Exceeded—**On when the **Prohibit Restoration** timer for this team expires. The timer only affects the team on which it expired. When enabled, the timer countdown is initiated at the same time the team begins a transfer process, usually when a sectionalizing event occurs. Often timers in adjacent teams start simultaneously, but there is no requirement for this. Each team decrements its timer independently and the teams may enter the **Prohibit Restoration** state asynchronously. Otherwise, off. **⚠ WARNING** Because teams may asynchronously enter a **Prohibit Restoration** state, one or more teams throughout a circuit may be prohibited from further automatic restoration activity. Other teams will still be available for subsequent restoration events. For this reason, it is extremely important standard safety practices are adhered to when working on a circuit that has been involved in an automatic transfer and restoration event. Disabling automatic operation and tagging devices are strongly recommended before performing any manual switching or repair. **Unsafe practices can result in serious personal injury or death if the recommended precautions are not followed.**
7	**Setup Data Revision—**On when the configuration entries for any enabled team defined in the control are modified. It remains on until the **Team Setup** command on the *Setup>Team* screen has been toggled from **Stopped** mode back to **Running** mode for any team where the configuration entries have been changed. Otherwise, off.
8	**Get Local Switch Data Issue—**On when the IntelliNode Interface Module does not receive all data necessary for IntelliTeam SG system operation from the external device. Otherwise, off.
9	**Manual Operation IT Team Condition—**On when any team registers a manual **Open** or **Close** operation and is not in the **Ready** state. Some manual operations do not cause this condition, such as closing a source switch at a previously faulted team for a **Return To Normal** operation, if **Return To Normal** operation is enabled. Off when a manual lever is moved back to the **Ready** or **Close** position.
10	**Source Loading Data is Active—**On when the real-time feeder loading logic is active and in use. This point does not indicate whether the control is using actual real-time feeder-loading data received from a DNP master or the **Default Source Segment Loading** setting. Otherwise, off.

TABLE CONTINUED ▶

Table 1. Status Points—Continued

Code #	Name—Definition
11	**Real-Time Load Data Problem—**On when the received DNP analog output value is less than the real-time three-phase load as sensed by the switch. It is also set if the real-time feeder-loading data have not updated within the configured time interval. Off when new data are received and the analog value is equal to or greater than the local measured load.
12	**Team 1 Ready to Transfer—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
13	**Team 2 Ready to Transfer—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
14	**Team 3 Ready to Transfer—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
15	**Team 4 Ready to Transfer—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
16	**Team 5 Ready to Transfer—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
17	**Team 6 Ready to Transfer—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
18	**Team 7 Ready to Transfer—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
19	**Team 8 Ready to Transfer—**On when the team is in the **Ready to Transfer** state. This point is off if the team is not in use, contains an **Error** condition, or the line section represented by the team contains a fault.
20	**IntelliTeam Overload Alarm—**On when the **Post Restoration Load Management** feature is operational, the substation feeder is supplying sections that it does not normally supply, and an **Overload** condition has been present when sampled for 10 consecutive times, 10 seconds apart. The alarm is cleared the first time an overload condition is not present when sampled or when the feeder is no longer supplying extra sections.
21	**IT Out of Normal Switch State—**On when the switch state is not the **Normally Open** or **Normally Closed** state for IntelliTeam system operation. Off when the switch state is the **Normally Open** or **Normally Closed** state for the IntelliTeam system.
22	**PLI Open—**On when the switch has been opened by the **Phase-Loss Isolation** (PLI) logic. Otherwise, off.
23	**IntelliNode Alarm—**On when any alarm is active. Otherwise, off.
24	**IntelliNode Warning—**On when any warning is active. Otherwise, off.
25	**Log Flooding—**On when one or more historic event is temporarily blocked from logging because of an exceptionally high rate of occurrence. The historic event is unblocked automatically once the rate of occurrence returns to a reasonable value. Off if there are no blocked events.
26	**CFM File Allocation in Progress—**On when CompactFlash® Memory Card files are being allocated. Otherwise, off.
27	**CFM Serious Disk Problem—**On when CompactFlash Memory Card access has been disabled because of an non-recoverable error while accessing CompactFlash Memory Card data. Otherwise, off.

TABLE CONTINUED ▶

Table 1. Status Points—Continued

Code #	Name—Definition
28	**CFM Disk Tampered—**On when the CompactFlash Memory Card file structure may have been modified from the outside. Otherwise, off.
29	**Any Phase Loss of Voltage—**On when status points from the external device report a voltage loss or the analog input from the external device is less than the configured **Voltage Loss Threshold** setting. Otherwise, off.
30	**Hot Line Tag—**On when the interface module detects that the **Hot Line Tag** feature of the external device is active. Otherwise, off.
31	**Remote Disabled—**On when the external device indicates it is not able to accept commands from a remote source. The remote source can be either SCADA or the IntelliNode Interface Module. Otherwise, off.
32	**Frequency Trip—**On when the interface module detects that the host device tripped open because of a frequency problem. The interface module forces a **Stop Transfer** condition, preventing the IntelliTeam SG system from attempting to operate the relay/recloser. Also, a **Prohibit Restoration** state is applied on the device, preventing all restoration to the teams associated with it until the state is manually removed. Otherwise, off.
33	**Ground Trip Mismatch—**On when the interface module detects the host **Ground Trip** feature is not in the configured state. The interface module assumes this change of state is because of human intervention and forces a **Stop Transfer** condition, preventing the IntelliTeam SG system from attempting to operate the relay/recloser device. Otherwise, off.
34	**Reclose Mismatch—**On when the interface module detects the host **Reclosing** feature is no longer in the configured state. The interface module assumes this change of state is because of human intervention and forces a **Stop Transfer** condition, preventing the IntelliTeam SG system from attempting to operate the relay/recloser device. Otherwise, off.
35	**Profile Mismatch—**On when the Normal Profile configuration is supported, the reported **Normal Profile** status does not match, and the 30-second timer for the IntelliTeam SG system to change the profile has expired. Otherwise, off.
36	**Protection Configuration Problem—**On when the interface module is configured to control the **Profile** setting in the external device, the interface module is configured to block and unblock a **Reclose** operation or the interface module is configured to initiate an **Extended Loss of Voltage Trip** operation in the external device; and status points, analog output points, or control points have not been programmed to support these features. Otherwise, off.
37	**Overcurrent—**On when the external device reports a detected **Overcurrent** condition on one or more phases. Otherwise, off.
38	**Tripped to Lockout—**On when the interface module detects the external device is in the **Tripped to Lockout** state because of an event. When the external device is in the **Lockout** state, the IntelliTeam SG system may begin the reconfiguration process. Otherwise, off.
39	**Recloser Cycling—**On when the recloser/relay is configured for the **Fault Cycling** mode and a fault cycling event is active. Otherwise, off.

TABLE CONTINUED ▶

Table 1. Status Points—Continued

Code #	Name—Definition
40	**Recloser Cycling Reset—**On when the recloser/relay is configured for the **Fault Cycling** mode and a **Reset** state is entered. Otherwise, off.
41	**Loss of Voltage Sectionalizing Enabled—**On when teams are in the **Ready** state and the IntelliTeam system instructs the interface module to enable an **Extended Loss of Voltage** operation if the interface module is configured for an **Extended Loss of Voltage** operation. Off when the team goes out of the **Ready** state and the IntelliTeam system disables the **Extended Loss of Voltage** feature.
42	**Single-Phase Trip—**On when the IntelliNode Interface Module has qualified a 1- or 2-phase voltage loss and has issued a **3-phase Open** command to the external device. This point is cleared after 45 minutes or when a **Close** state is active. Otherwise, off.
43	**Three-Phase Trip—**On when the IntelliNode Interface Module has qualified a 3-phase voltage loss and has issued a **3-phase Open** command to the external device. This point is cleared after 45 minutes or when a **Close** state is active. Otherwise, off.
44	**External Device Comm Stopped—**On when the **Device Data Updates** setpoint is set to “Stopped” and cleared when it is set to the **Running** state.
45	**External Device Comm Lost—**On when the external device is not responding to communication from the IntelliNode Interface Module. Otherwise, off.
46	**External Device Problem—**On when any of the four trouble status points being returned by the external device are active (Status points: 44, 45, 47, or 48). Otherwise, off.
47	**External Device Contacts Bad—**On when the external device is reporting the **Open** and **Closed** states at the same time. Otherwise, off.
48	**External Device Polled Data Bad—**On when the reported binary input point count from the external device exceeds the supported limit of 216, or the received analog input point count exceeds 126, or any bad status is reported in the binary input or analog input points. Otherwise, off.
49	**Netlist Settings Propagation—**On when the IntelliNode Interface Module is receiving Netlist records from either a download or through propagation. If this is a Netlist download, the status point remains on until all expected runners arrive with the new Netlist. Otherwise, off.
50	**Netlist Missing Runners—**On when the received runner count doesn’t match the expected runner count. The **Rapid Self Healing** feature is disabled as long as this is the case. Otherwise, off.
51	**Netlist Settings Accepted—**On when a new Netlist has been successfully validated. Off when a Netlist is being downloaded or propagated. Off if the user has changed any team settings so they are different from the screenset.
52	**Netlist Propagation Enabled—**On when the IntelliLink software screenset or SCADA enables Netlist propagation. Otherwise, off. (Starting with revision 7.1.x, the **Netlist Propagation** mode is always in the **Enabled** state; therefore, this status point is always on.)
53	**IntelliTeam II Mode Active—**On when IntelliTeam II software is in use. Otherwise, off.
54	**GPS Not Active Time Source—**On when the GPS feature is not the active time source. Otherwise, off.
55	Reserved.

TABLE CONTINUED ►

Table 1. Status Points—Continued

Code #	Name—Definition
56	Reserved.
57	Reserved.
58	Reserved.
59	**Comm System has Poor Quality—**On when the **Bad Health** alarm is active on the *Link Keep Alive Tests* screen and/or the *Diagnostic Communications Tests* screen. Otherwise, off.
60	**Bus One Shot Active—**On when the bus one-shot logic opens the switch and is actively in a reclosing sequence. Off when the switch closes back in after a successful reclose of the main breaker or locks out because of a fault on the bus. When active, the **IntelliTeam** logic will not treat this event as a **Manual** operation and take the teams out of the **Ready** state.
61	**Bus One Shot Lockout—**On when the bus one-shot logic unsuccessfully recloses the main breaker resulting in a **Lockout** state. The **IntelliTeam** logic keeps the teams in the **Ready** state so that the segment can be restored by an alternate source.
62	**IntelliLink Intrusion—**On when an IntelliLink software log-in attempt failed 3 times, after which all users are locked out for 15 minutes. Otherwise, off.
63	**IntelliLink Session Active—**On when user is presently logged in to the control. Otherwise, off.
64	**Not all Teams Xfer Ready for X sec—**On when any team in which this control is a member is in the **Out of Ready** state for a time exceeding the **Not All Teams Transfer Ready for X Seconds** timer. The status point becomes inactive when a new valid coach arives and the team goes back into the **Ready** state.
65	**Prohibit Restoration Remotely Transmitted—**On when the local device sends the **Prohibit Restoration SCADA** command to remote devices in the Remote Prohibit Restoration Transmit List table because of an active **Hot Line Tag**, **Frequency Trip**, or **Manual Operation** state, or when a **Prohibit Restoration** state is activated via a front panel, IntelliLink software screen, or SCADA command. The status point is cleared when the device receives a **Clear Remote Prohibit Restoration Status** command from SCADA. Status point = 0x1F00.
66	**Enable Restoration Remotely Transmitted—**On when the local device sends the **Clear Remote Prohibit Restoration Status** command to remote devices in the Remote Prohibit Restoration Transmit List table. This event can be triggered by executing a **Clear Remote Prohibit Restoration Status** command via IntelliLink or receiving an **IT Clear PR to all Devices** command from SCADA. The status point is cleared when the device receives the **Clear Remote Enable Restoration Status** control point. Status point = 0x1F01.
67	**Normal Current Direction—**On when the device is properly configured and power is flowing through the circuit in the normal direction. Status point = 0x167.
68	**Reverse Current Direction—**On when the device is configured incorrectly or circuit conditions cause the direction of current flow to reverse, possibly because of distributed generation on the circuit. Status point = 0x168.
69	**Current Direction Mismatch—**On when both the **Normal Current Direction** and **Reverse Current Direction** status points are either active or inactive. Only valid when the **Current Direction Detection Method** setpoint is set to “Status Points” and a user has assigned a point number to both status points. Status point = 0x169.

TABLE CONTINUED ►

Table 1. Status Points—Continued

Code #	Name—Definition
70	**Transfer Trip Enabled—**On when the **Transfer Trip** state is enabled to allow the local device to send an **Initiate Transfer Trip** command to all non-zero RTU addresses in the Remote Transfer Trip Transmit List table after an **Open** and **Lockout** state because of a protection or automatic sectionalizing event. Status point = 0x1F02.
71	**Transfer Trip PR Initiated—**On when an **Initiate Transfer Trip** control point has been received and executed. Off when the **Prohibit Restoration** state is no longer active and the control will be allowed to close by an automatic or manual operation. **Note:** This status point only applies to devices not teamed with a DG source. When teamed with DG, this status point will not get activated, even if the **Transfer Trip** command is initiated and executed. Status point = 0x021C.
72	**Remote PR Enabled from Local—**On when the **Enable Remote Transmit from Local P.R.** setting is enabled on the local device. Status point = 0x1F03.
73	**Remote PR Enabled from SCADA—**On when the **Enable Remote Transmit from SCADA P.R.** setting is enabled on the local device. Status point = 0x1F04.
74	**Disregard First Overcurrent Active—**On when the **Disregard First Overcurrent** setting is enabled. When enabled, the IntelliTeam application disregards the first overcurrent event when a fault is detected on the circuit and does not count it as a fault. Instead, it waits until after the first reclose/PulseClosing® Technology sequence to allow the distributed generation to be taken offline and then starts counting fault events from that point forward. Otherwise, off.
75	**DG Reconnect Delay Terminated—**The **DG Reconnect Delay** timer is aborted because of an abnormal system condition. The **Transfer Trip Prohibit Restoration** (TTPR) state remains active on the device and reconnecting the DG source back on the grid must be performed manually.
76	**Transfer Declined Due To Excessive Load—**Active when a transfer attempt has been declined because load within the team(s) to be restored exceeds the present capacity of the alternate source. Inactive if another reason for the declined transfer occurs at the same control, if the transfer stops because of **Prohibit Restoration** or other error condition at any team member of this team, if the transfer succeeds at any team member of this team, or 5 minutes passes at this control with no further **Transfer Declined** conditions as a result of excessive loading.
77	**Transfer Declined Due To Line Segment Limit**—Active when a transfer attempt has been declined because the number of teams requested for restoration exceeds the **Line Segment Limit** setting associated with the alternate source. Inactive if another reason for the declined transfer occurs at the same control, if the transfer stops because of **Prohibit Restoration** or other error condition at any team member of this team, if the transfer succeeds at any team member of this team, or 5 minutes passes at this control with no further **Transfer Declined** conditions as a result of the **Line Segment Limit** setting.
78	**System Voltage Unrecognized—**Active when the local system voltage is not recognized as a supported system voltage. It remains active until the issue is resolved through correct configuration of the system voltage setting.

TABLE CONTINUED ▶

Table 1. Status Points—Continued

Code #	Name—Definition
79	**Xfer Trip PR Initiated (DG POI)**—On when an **Initiate Transfer Trip** control point has been received and executed by the IntelliTeam system device teamed with the distributed generation. Off when the **Prohibit Restoration** state is no longer active and the control will be allowed to close by an automatic or manual operation. **Note:** This status point only applies to devices teamed with a distributed generation source. If a device is not teamed with distributed generation, this status point will not be activated, even when a **Transfer Trip** command is initiated and executed.
80	**NET: Missing Runners in Adjacent FeederNet**—On when runners are missing in any adjacent FeederNet in an IntelliTeam system. Off when that condition does not exist in any adjacent FeederNet.
81	**Transfer Trip Sent**—On when a device sends a **Remote Transfer Trip** message via the Remote Transmit list after it has opened and locked out because of a Protection or Automatic Sectionalizing event. Off when the device is closed and in the **Ready** state.
82	**PR Due To Load Shed—**On when a Load Shedding event occurs at a team with a **Load Priority** setting configured in the do-not-restore range 20 to 25, activating a **Prohibit Restoration** state for that team. This point will be off when the source circuit returns to normal allowing the **PR Due To Load Shed** status point to clear, or when the **Prohibit Restoration** state is cleared by local command or SCADA command.

Table 2. Analog Output Points

Code #	Name—Definition
1	**Application Layer Confirmation Retry Time—**Time (100 to 65535 ms.) the interface module will wait for an application layer confirmation to an event response message before resending the request for confirmation.①②
2	**Application Layer Confirmation Retry Count—**Number of times (0 to 10) the interface module will send an event response message if a confirmation is not received. This number includes the initial response. The retry count is only in effect when the confirmation process is enabled.
3	**Control Point Select Time—**During a select-before-operate procedure, the time (10 to 1000 tenths of a second) allowed to elapse between receiving the **Select** function for a point and receiving the **Operate** function for it. If an **Operate** function is not received within this period, the point is de-selected; another **Select** function is required before the point will operate.
4	**Real-Time Feeder Loading—**Total averaged three-phase feeder loading (in amperes), measured at the source breaker. This value is used to determine whether the load can be transferred to another source. Each count equals one ampere.

① Set and read the **Application Layer Confirmation Retry Time** setpoint based on the required range:

Application Layer Confirmation Retry Time Range	Set Analog Output Value	Read Analog Output Value
100 to 32,737 ms.	Group 41 variation 2 (16-bit)	Group 40 variation 2 (16-bit with flag)
32,738 to 65,535 ms.	Group 41 variation 1 (32-bit)	Group 40 variation 1 (32-bit with flag)

② Class 0 will always report group 40 variation 2 and will report negative value for 32-bit values. Use group 40 variation 1 to read values between 32,738 to 65,535 ms.

Table 3. Control Points

Code #	Name—Definition
1	**IntelliTeam Prohibit Restoration—**Enable or disable the **IntelliTeam SG Prohibit Restoration** function.
2	**IntelliTeam Clear Manual Operation—**A momentary pulse point is used to clear a **Manual Operation** indication. This allows the IntelliTeam SG system to return to the **Ready** state provided the switch contacts are in the **Normally Open** or **Normally Closed** state for the IntelliTeam system.
3	**Initiate Open Cmd on Loss of Voltage—**Enable or disable a **Loss of Voltage** sectionalizing operation provided by the **IntelliNode Interface Module** logic.
4	**Netlist Propagation Enable/Disable—**In the **Enabled** state, allows new Netlist requests and Netlist transmissions. In the **Disabled** state, multiple downloads of a Netlist can be sent to a local control. (Starting with revision 7.1.x, the **Netlist Propagation** mode is always in the **Enabled** state; therefore, this control point does not operate.)
5	**Clear IntelliLink Intrusion—**This command clears the **IntelliLink Intrusion** status point.
6	**Clear Remote Prohibit Restoration Status—**This command clears the **Prohibit Restoration Remotely Transmitted** status point. Control point = 0x1F00.
7	**Clear Remote Enable Restoration Status—**This command clears the **Enable Restoration Remotely Transmitted** status point. Control point = 0x1F01.
8	**Remote Transmit Enable Restoration—**When received, the device clears the **Prohibit Restoration** state locally (only if the **Hot Line Tag**, **Frequency Trip**, or **Manual Operation** states are not active) and then sends a command to clear the **Prohibit Restoration** state to all devices in the Remote Prohibit Restoration Transmit List table. The **Enable Remote Transmit from SCADA P.R.** setting must be enabled to perform this action. Control point = 0x1F02.
9	**Initiate Transfer Trip—**This command sets the **Transfer Trip** state on a single device. The device issues a command to **Open the switch in Automatic** mode (not a manual operation) and verifies the operation. If an **Open** state is confirmed, the device then activates the **Prohibit Restoration** state on the team facing the DG source (unless it's a DG team) to prevent restoration of that line segment. For the **Prohibit Restoration** state to be set, the receiving device must be an S&C switch control that is part of an IntelliTeam SG system. SW1 = 0x202, SW2 = 0x203.
10	**Enable/Disable Transfer Trip—**When enabled, the local device sends an **Initiate Transfer Trip** command to all non-zero RTU addresses in the Remote Transfer Trip Transmit List table following an **Open** and **Lockout** state because of a Protection or Automatic Sectionalizing event. When disabled, no condition will result in sending an **Initiate Transfer Trip** command to remote devices. Control point = 0x1F03.
11	**Enable/Disable Remote PR from Local—**When enabled, a local **Prohibit Restoration** command (via the front panel or IntelliLink software screen) will place the device in a **Prohibit Restoration** state and then transmit a **Prohibit Restoration** command to all devices in the Remote Prohibit Restoration Transmit list. Control point = 0x1F04.
12	**Enable/Disable Remote PR from SCADA—**When enabled, the device will enter a **Prohibit Restoration** state and then transmit a **Prohibit Restoration** command to all devices in the Remote Prohibit Restoration Transmit list if any the following statuses are active: **Hot Line Tag**, **Frequency Trip**, **Manual Operation**, or the **Prohibit Restoration** state is activated from a SCADA command. Control point = 0x1F05.
13	**Enable/Disable DIFF—**When enabled, the device will enter the **Disregard First Fault** (Overcurrent) mode.

TABLE CONTINUED ▶

Table 3. Control Points—Continued

Code #	Name—Definition
14	**IntelliTeam Clear Manual Operation (Any State)—**A **Pulse-On** or **Latch-On** command is used to clear a manual operation. Clearing a **Manual Operation** condition using this command allows the IntelliTeam system to return to the **Ready** state if all members of the team are in their **Normaly Open** or **Normally Closed** state, or enter a team **Wait** state and be prepared to take action on additional contingencies if the team is not in its **Normaly Open** or **Normally Closed** state. **Note:** Manual operation conditions must be removed at all team members for the team to take action on additional contingencies.

Table 4. Counter Points

Code #	Name—Definition
1	**New Coach Generated on Team—**This is the number of coach generations on the team. The counter is incremented on each coach generation. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
2	**Team Communication Problem—**This is the number of communication problems. The counter is incremented on each communication problem. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
3	**Unexpected State Change—**This is the number of unexpected state changes. The counter is incremented on each unexpected state change. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
4	**Rebuilding Coach—**This is the number of **Coach Rebuild** operations. The counter is incremented on each coach rebuild operation. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
5	**Issue Put Coach Task List—**This is the number of errors entering the coach on the task list. The counter is incremented on each error. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
6	**Issue Put Event Task List—**This is the number of errors entering an event on the task list. The counter is incremented on each error. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
7	**Issue Put Member Task List—**This is the number of errors entering a member on the task list. The counter is incremented on each error. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
8	**Issue Put Comm Task on List—**This is the number of errors entering a communication entry on the task list. The counter is incremented on each error. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
9	**Sequence Number Resync—**This is the number of sequence number resynchronizations. The counter is incremented on each resynchronization operation. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
10	**Compact Flash Issue—**This is the number of CompactFlash Memory Card issues. The counter is incremented on each CompactFlash Memory Card issue. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
11	**LOG Logging Overflow—**This is the number of log overflows. The counter is incremented on each log overflow. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
12	**CFM Disk Problem—**This is the number of disk problems. The counter is incremented on each disk problem. This is a 32-bit counter and will overflow back to zero at 4,294,967,295.
13	**IntelliLink Intrusion Attempt—**This is the number of IntelliLink software log-in attempts that failed three times, after which all users are locked out for 15 minutes.

Table 5. Group O Objects

Variation	Variation Name	Name—Definition
204	Device location longitude	This is the longitude of the control provided by GPS in decimal degree based on the WGS84 reference. A value of zero is returned when a GPS signal is not available, the fix quality is in the **Invalid** state, or no GPS module is installed. When the GPS module is installed the present position is always returned, even when **GPS** mode is not selected for the **Time Source Synchronization** setpoint on the *Setup>General>Time* screen.
205	Device location latitude	This is the latitude of the control provided by GPS in decimal degree based on the WGS84 reference. A value of zero is returned when a GPS signal is not available, the fix quality is in the **Invalid** state, or no GPS module is installed. When the GPS module is installed the present position is always returned, even when **GPS** mode is not selected for the **Time Source Synchronization** setpoint on the *Setup>General>Time* screen.
242	Device manufacturer's software version	The S&C implementation will return a string containing the MCU Application, MCU EOS, DSP Application, and DSP EOS version numbers. The following is an example of the string that will be returned: "003.003.004.003 060.001.021.043 003.003.003.000 050.008.000.014," representing MCU Application 3.3.4.3, MCU EOS 60.1.21.43, DSP Application 3.3.3.0, and DSP EOS 50.8.0.14.
248	Device serial number	The S&C implementation will return a string containing the IntelliNode Interface Module serial numbers. The following is an example of the string that will be returned: "ITN-0068-00030."

This implementation of DNP and this section of documentation conform to the document "DNP V3.00 Subset Definitions, Version 2.00," available from the DNP Users Group. This section describes the compatibility of S&C's implementation of DNP with other devices.

Table 6. Device Profile Description

<table>
<tr><td colspan="2">DNP V3.00
DEVICE PROFILE DOCUMENT</td></tr>
<tr><td colspan="2">Vendor Name: S&C Electric Company</td></tr>
<tr><td colspan="2">Device Name: S&C IntelliNode Interface Module</td></tr>
<tr><td>Highest DNP Level Supported:
For Requests - Level 2
For Responses - Level 2</td><td>Device Function:
_ _ Master X Slave</td></tr>
<tr><td colspan="2">Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP Levels Supported (the complete list is described in the attached table):
8-Bit Unsigned Integers
_ _
_ _
_ _
_ _</td></tr>
<tr><td>Maximum Data Link Frame Size (bytes)
Transmitted - 292
Received - 292</td><td>Max Application Fragment Size (bytes)
Transmitted - 2048
Received - 2048</td></tr>
<tr><td>Maximum Data link Retries:
X None
_ _ Fixed at _ _ _ _ _ _ _ _ _
_ _ Configurable, range 1 to 25</td><td>Maximum Application Layer Retries:
_ _ None
_ _ Fixed at _ _ _ _ _ _ _ _ _
X Configurable, range 0 to 10</td></tr>
</table>

TABLE CONTINUED ►

Table 6. Device Profile Description—Continued

Requires Data Link Layer Confirmation:

X Never
_ _ Always
_ _ Sometimes If "Sometimes," when?
_ _ Configurable If "Configurable," how?

Requires Application Layer Confirmation:

_ _ Never
_ _ Always (not recommended)
X When reporting event data (Slave devices only)
_ _ When sending multi-fragment responses (Slave devices only)
_ _ Sometimes If "Sometimes," when?
_ _ Configurable If "Configurable," how?

Timeouts while waiting for:

Data Link Confirm	X None	_ _ Fixed	_ _ Variable	_ _ Config
Complete Appl. Fragment	_ _ None	X Fixed	_ _ Variable	_ _ Config
Application Confirm	_ _ None	_ _ Fixed	_ _ Variable	X Config
Complete Appl. Response	X None	_ _ Fixed	_ _ Variable	_ _ Config

Others _
_ _

Attach explanation if "Variable" or "Configurable" was checked
(See Note 1 on page 18 for explanation)

Sends/Executes Control Operations:

Write Binary Outputs	X Never	_ _ Always	_ _ Sometimes	_ _ Config
Select/Operate	_ _ Never	_ _ Always	X Sometimes	_ _ Config
Direct Operate	_ _ Never	_ _ Always	X Sometimes	_ _ Config
Direct Operate - NO ACK	_ _ Never	_ _ Always	X Sometimes	_ _ Config
Count > 1	X Never	_ _ Always	_ _ Sometimes	_ _ Config
Pulse On	_ _ Never	_ _ Always	X Sometimes	_ _ Config
Pulse Off	_ _ Never	_ _ Always	X Sometimes	_ _ Config
Latch On	_ _ Never	_ _ Always	X Sometimes	_ _ Config
Latch Off	_ _ Never	_ _ Always	X Sometimes	_ _ Config
Queue	X Never	_ _ Always	_ _ Sometimes	_ _ Config
Clear Queue	X Never	_ _ Always	_ _ Sometimes	_ _ Config

Attach explanation if "Sometimes" or "Configurable" was checked
(See Note 2 on page 18 for explanation)

TABLE CONTINUED ►

Table 6. Device Profile Description—Continued

FILL OUT THE FOLLOWING ITEM FOR MASTER DEVICES ONLY:	
Master Expects Binary Input Change Events: _ _ Either time-tagged or non-time-tagged for a single event _ _ Both time-tagged and non-time-tagged for a single event _ _ Configurable (attach explanation)	
FILL OUT THE FOLLOWING ITEMS FOR SLAVE DEVICES ONLY:	
Reports Binary Input Change Events when no specific variation requested: _ _ Never X Only time-tagged _ _ Only non-time-tagged _ _ Configurable to send both	Reports time-tagged Binary Input Change Events when no specific variation requested: _ _ Never X Binary Input Change with Time _ _ Bin In Change Relative Time _ _ Configurable (explain)
Sends Unsolicited Responses: _ _ Never X Configurable (explain) _ _ Only certain objects _ _ Sometimes (explain) _ _ ENABLE/DISABLE UNSOLICITED Function codes supported (See Note 3)	Sends Static Data in Unsolicited Responses: _ _ Never _ _ When device restarts X When status flags change No other options are permitted. (See Note 3)
Default Counter Object/Variation: _ _ No counters reported _ _ Configurable (explain) X Default object - 20 Default variation - 5 _ _ Point-by-point list attached	Counters Roll Over at: _ _ No counters reported _ _ Configurable (explain) _ _ 16 Bits X 32 Bits _ _ Other value _ _ _ _ _ _ _ _ _ _ _ _ Point-by-point list attached
Sends Multi-Fragment Responses (Slave Only): X Yes _ _ No	

Note 1: Timeouts While Waiting for Confirmations

For an unsolicited response when an application layer response confirmation is requested, the switch control waits before sending another response/confirmation attempt (if the retry number has not been reached) or stopping the **Confirmation** process.

Set the **Time Delay Between Retries** function with the setup software or via SCADA. (See S&C Instruction Sheet 1043-531, "IntelliNode Interface Module: *Setup*," for more information.)

Note 2: Control Operations Executed

For all **Binary Output Relay (g12)** operations and **Analog Output (g41)** operations, the supported application layer function codess are:

- **Select (3)**
- **Operate (4)**
- **Direct Operate (5)**
- **Direct Operate No Ack (6)**

The control codes supported for **Binary Output Command** operations are:

Control Code	TCC Field	Op Type Field
0x01	NUL	PULSE_ON
0x03	NUL	LATCH_ON
0x04	NUL	LATCH_OFF
0x41	CLOSE	PULSE_ON
0x81	TRIP	PULSE_ON

For **Binary Output Command** operations, set the **Count** value to "1," **Queue** and **Clear** fields to "0," and **On-Time** and **Off-Time** fields to any valid values. The control will ignore the **On-Time** and **Off-Time** fields in the request. For the **Select** and **Operate** command sequence, the value of the **On-Time** and **Off-Time** fields must match between **Select** and **Operate** requests otherwise the command will not be executed.

For a **Binary Output Command** requests with the **Clear** field set to "1," the control will return a status code 4 [NOT_SUPPORTED] in its response and the operation will not be executed.

For more details on **Binary Output Command** operations, see the "Control Relay Output Block" section in the Object library section of "IEEE std 1815TM-2012."

Note 3: Unsolicited Responses

The interface module returns unsolicited responses to the configured master station address when a change occurs in any mapped status point configured for event reporting, when the configured deadband is exceeded in any mapped analog input point that is configured for event reporting, or when the configured deadband is exceeded for any mapped counter point that is configured for event reporting.

Control the delivery of unsolicited response messages by adjusting configuration of the **Unsolicited Transmit Delay Event Count** setting and the **Unsolicited Transmit Delay Time** setting.

Enable and disable unsolicited responses from the setup software or via SCADA (function code 20 to enable; function code 21 to disable).

This section describes which objects and requests this implementation accepts and which responses are returned. **Object**, **Variation**, and **Qualifier** codes in the request must exactly match what is expected. All application layer responses use the standard response function code 129. Unsolicited responses, if configured, will always use function code 130. Included in the table is the default variation returned if no specific variation is requested. This also applies to class data and unsolicited reports where applicable

Table 7. Implementation

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
1	0	Binary Input - All variations	1	06	01
1	1	Binary Input	1	06	
1	2	Binary Input with Status	1	06	
2	0	Binary Input Change - All variations	1	06,07,08	02
2	1	Binary Input Change without Time	1	06,07,08	
2	2	Binary Input Change with Time	1	06,07,08	
2	3	Binary Input Change with Relative Time (object parsed but no data to return)	1	06,07,08	
10	0	Binary Output - All variations	1	06	02
10	1	Binary Output (object parsed but Write not used)			
10	2	Binary Output Status (only the on-line bit is used)	1	06	
12	0	Control Block - All variations			
12	1	Control Relay Output Block	3,4, 5,6	17,28	echo of request
12	2	Pattern Control Block			

TABLE CONTINUED ►

Table 7. Implementation—Continued

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
12	3	Pattern Mask			
20	0	Binary Counter - All variations	1,7,8 9,10	06	05
20	1	32-Bit Binary Counter	1	06	
20	2	16-Bit Binary Counter	1	06	
20	3	32-Bit Delta Counter			
20	4	16-Bit Delta Counter			
20	5	32-Bit Binary Counter without Flag	1	06	
20	6	16-Bit Binary Counter without Flag	1	06	
20	7	32-Bit Delta Counter without Flag			
20	8	16-Bit Delta Counter without Flag			
21	0	Frozen Counter - All variations	1	06	09
21	1	32-Bit Frozen Counter	1	06	
21	2	16-Bit Frozen Counter	1	06	
21	3	32-Bit Frozen Delta Counter			
21	4	16-Bit Frozen Delta Counter			
21	5	32-Bit Frozen Counter with Time of Freeze			
21	6	16-Bit Frozen Counter with Time of Freeze			

TABLE CONTINUED ►

Table 7. Implementation—Continued

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
21	7	32-Bit Frozen Delta Counter with Time of Freeze			
21	8	16-Bit Frozen Delta Counter with Time of Freeze			
21	9	32-Bit Frozen Counter without Flag	1	06	
21	10	16-Bit Frozen Counter without Flag	1	06	
21	11	32-Bit Frozen Delta Counter without Flag			
21	12	16-Bit Frozen Delta Counter without Flag			
22	0	Counter Change Event - All variations	1	06,07,08	05
22	1	32-Bit Counter Change Event without Time	1	06,07,08	
22	2	16-Bit Counter Change Event without Time	1	06,07,08	
22	3	32-Bit Delta Counter Change Event w/o Time			
22	4	16-Bit Delta Counter Change Event w/o Time			
22	5	32-Bit Counter Change Event with Time	1	06,07,08	
22	6	16-Bit Counter Change Event with Time	1	06,07,08	
22	7	32-Bit Delta Counter Change Event w/ Time			
22	8	16-Bit Delta Counter Change Event w/ Time			
23	0	Frozen Counter Event - All variations			
23	1	32-Bit Frozen Counter Event without Time			

TABLE CONTINUED ►

Table 7. Implementation—Continued

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
23	2	16-Bit Frozen Counter Event without Time			
23	3	32-Bit Frozen Delta Counter Event w/o Time			
23	4	16-Bit Frozen Delta Counter Event w/o Time			
23	5	32-Bit Frozen Counter Event with Time			
23	6	16-Bit Frozen Counter Event with Time			
23	7	32-Bit Frozen Delta Counter Event w/ Time			
23	8	16-Bit Frozen Delta Counter Event w/ Time			
30	0	Analog Input - All variations	1	06	04
30	1	32-Bit Analog Input	1	06	
30	2	16-Bit Analog Input	1	06	
30	3	32-Bit Analog Input without Flag	1	06	
30	4	16-Bit Analog Input without Flag	1	06	
31	0	Frozen Analog Input - All variations			
31	1	32-Bit Frozen Analog Input			
31	2	16-Bit Frozen Analog Input			
31	3	32-Bit Frozen Analog Input with Time of Freeze			
31	4	16-Bit Frozen Analog Input with Time of Freeze			

TABLE CONTINUED ►

Table 7. Implementation—Continued

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
31	5	32-Bit Frozen Analog Input without Flag			
31	6	16-Bit Frozen Analog Input without Flag			
32	1	32-Bit Analog Change Event without Time	1	06,07,08	
32	2	16-Bit Analog Change Event without Time	1	06,07,08	
32	3	32-Bit Analog Change Event with Time	1	06,07,08	
32	4	16-Bit Analog Change Event with Time	1	06,07,08	
33	0	Frozen Analog Event - All variations			
33	1	32-Bit Frozen Analog Event without Time			
33	2	16-Bit Frozen Analog Event without Time			
33	3	32-Bit Frozen Analog Event with Time			
33	4	16-Bit Frozen Analog Event with Time			
40	0	Analog Output Status - All variations	1	06	02
40	1	32-Bit Analog Output Status	1	06	
40	2	16-Bit Analog Output Status	1	06	
41	0	Analog Output Block - All variations			
41	1	32-Bit Analog Output Block	3,4, 5,6	17,28	echo of request
41	2	16-Bit Analog Output Block	3,4, 5,6	17,28	echo of request

TABLE CONTINUED ►

Table 7. Implementation—Continued

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
50	0	Time and Date - All variations			
50	1	Time and Date - Absolute Time	2	07 limited quantity =1	IINs only
50	2	Time and Date with Interval			
50	3	Time and Date - Absolute time at last recorded time	2	07 limited quantity =1	IINs only
51	0	Time and Date CTO - All variations			
51	1	Time and Date CTO			
51	2	Unsynchronized Time and Date CTO			
52	0	Time Delay - All variations			
52	1	Time Delay Coarse (response for a restart request)	13		
52	2	Time Delay Fine (response for a delay measure request)	23		
60	1	Class 0 Data	1	06	
60	2	Class 1 Data	1	06,07,08	
60	3	Class 2 Data	1	06,07,08	
60	4	Class 3 Data	1	06,07,08	

TABLE CONTINUED ►

Table 7. Implementation—Continued

OBJECT			REQUEST		RESPONSE
Obj	Var	Description	Func Code (dec)	Qualifier Codes (hex)	Default Var. (hex)
80	1	Internal Indications	2	00 index=7	
81	1	Storage Object			
82	1	Device Profile			
83	1	Private Registration Object			
83	2	Private Registration Object Descriptor			
90	1	Application Identifier			
100	1	Short Floating Point			
100	2	Long Floating Point			
100	3	Extended Floating Point			
101	1	Small Packed Binary-Coded Decimal			
101	2	Medium Packed Binary-Coded Decimal			
101	3	Large Packed Binary-Coded Decimal			
102	0	8-Bit Unsigned Integer			
102	1	8-Bit Unsigned Integer	1,2	04	
No Object			13		
No Object			23		
No Object			24		